

University of Bahrain  
College of Information Technology  
Department of Computer Science  
ITCS252 Discrete Mathematics  
Quiz #1

ID: \_\_\_\_\_ Name: \_\_\_\_\_

Section: 04

Q1: Let  $U = \{0, 1, 2, \dots, 9\}$ ,  $A = \{0, 1, 2, 3\}$ ,  $B = \{0, 2, 4\}$ , and  $C = \{0, 3, 6, 9\}$ . Find

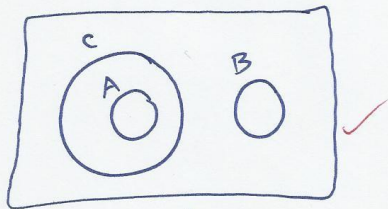
$A \cap B = \{0, 2\}$

$C - \{0, 3\} = (A \cap B) \times (C - \{0, 3\}) = \{(0, 6), (0, 9), (2, 6), (2, 9)\}$

$\{6, 9\}$

$A \times \emptyset = \emptyset$

Q2: Draw Venn Diagram to describe sets  $A, B$ , and  $C$  that satisfies the given conditions  $A \times \emptyset, (A \cap B) \times (C - \{0, 3\})$ .



$A \cap B = \emptyset$

$A \subseteq C$

$C \cap B = \emptyset$

Q3: Let  $A = \{x \mid x^2 + x = 2\}$  and  $B = \{1, -1\}$ . Show that  $A \neq B$ .

~~$B = \{1, -1\}$~~

$A = \{1, -2\}$

$\therefore A \neq B$

$$\begin{aligned} x^2 + x &= 2 \\ x^2 + x - 2 &= 0 \\ (x+2)(x-1) &= 0 \\ x &= -2 \quad \text{or} \quad x = 1 \end{aligned}$$

Q4: Let  $A = \{1, 2, 3, 4\}$ ,  $C = \{5, 6, 7, 8\}$ , and  $B = \{n \mid n \in A \text{ and } n + m = 8 \text{ for some } m \in C\}$ . Show that  $A \not\subseteq B$ .

$\therefore A = \{1, 2, 3, 4\}$ ,

$B = \{1, 2, 3\}$  ✓

$\therefore A \not\subseteq B$

$n$	$m$	$n+m$
1	7	8
2	6	8
3	5	8

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Second Semester 2011/2012  
Quiz #2

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Section: 04

Q1: Consider the statement: "<sup>P</sup>Ahmed plays Football or <sup>¬q</sup>does not play Basketball"

- (a) Write the statement in the form IF-THEN in English.  $P \rightarrow q$   $P$ : Ahmed plays Football  
 $q$ : play Basketball  
 ~~$\neg q$ : does not play Basketball~~  
 IF Ahmed <sup>does not</sup> plays Football, then he <sup>does not</sup> play Basketball.

- (b) Write the negation of the statement in English.  ~~$P \wedge \neg(\neg q) \equiv P \wedge q$~~   
~~Ahmed plays Football, but does not play Basketball~~  
~~Basketball~~ Ahmed <sup>does not</sup> plays Football and plays Basketball.

Q2: Write each of these statements in the form "if  $p$ , then  $q$ " in English.

- (a) Getting that job requires knowing someone who knows the boss.

IF you know someone who knows the boss, ✓  
then you will get that job.

- (b) You can go to the Super Bowl unless you can't afford the ticket.

IF you afford the ticket, then you can ✓  
go the Super Bowl.

Q3: Write the contrapositive of  $|1| < 3$  if  $-3 < 1 < 3$ .

$$\frac{\text{P}}{-3 < 1 < 3} \rightarrow \frac{\text{Q}}{|1| < 3}$$

contrapositive:  $\neg Q \rightarrow \neg P$

$$\neg(|1| < 3) \rightarrow \neg(-3 < 1 < 3) \equiv$$

$$|1| > 3 \rightarrow -3 > 1 > 3$$

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Quiz #3

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Q1: Prove using truth table that the following argument is valid.

$$\begin{array}{l} p \vee q \\ p \rightarrow r \\ q \rightarrow r \\ \hline \therefore r \end{array}$$

			promises			conclusion	
p	q	r	$p \vee q$	$p \rightarrow r$	$q \rightarrow r$	r	
T	T	T	<u>T</u>	<u>T</u>	<u>T</u>	<u>T</u>	$\Rightarrow$ critical rows
T	T	F	<u>T</u>	<u>F</u>	<u>F</u>	<u>F</u>	
T	F	T	<u>T</u>	<u>T</u>	<u>T</u>	<u>T</u>	$\Rightarrow$ ✓
T	F	F	<u>T</u>	<u>F</u>	<u>T</u>	<u>F</u>	
F	T	T	<u>T</u>	<u>T</u>	<u>T</u>	<u>T</u>	$\Rightarrow$
F	T	F	<u>T</u>	<u>T</u>	<u>F</u>	<u>F</u>	
F	F	T	F	T	T	T	
F	F	F	F	T	T	F	

$\therefore$  valid